+ It was impossible for man to remain long an unconcerned &c

+ By what means shall we best acquire a knowledge of these subjects — The answer to this important question constitutes the principal object of the present volume —

+ Nature may be considered in 3 points of view 1. as a subject of History 2. as a work of art and 3 as a subject of Philosophy and the study of Nature may be accordingly be distinguished in Natural History
Natural Theology and
Natural Philosophy

Natural History describes things as they are, and relates what happens to them —

— To ease the memory and subject the various objects in nature more conveniently to ~~them~~ examination the Nat: Hist: divides them into ~~classes~~ classes — Genera — Species —

— Animals — Vegetables — Minerals —

+ Animals — Beasts — Birds — Fishes — Insects —

Object 1st to ascertain all the

+ Great classes 2d. To reduce every

— Individual to that class —

+ Objects the Materials of History

— Dictionary — Grammar —

+ There are two only two modes of studying Nature founded on the natural progress of mind, the investigation of causes and the Explanation of Phenomena —

+ Great importance —

+ Analysis Algebra —

— Steam engine — Gravity —

+ Synthesis — Geometry —

++ Analogy — Induction

×× 3 Examples of both Anal. or Syn.

1 Algebra 3x+5=17 —

— 2 ways of proof —

2 Albion Mills —

3. Art —

+ Analyses — Discovery
— Synthesis — Communicable 5c
+ Principle of induction minds
++ Child — Philosopher —

× In every important case the Author of Nature has not left us to the cool deductions of reason and expediency
— Instinctive principles —
— Curiosity — not in Animals
+ Extends to the body — Circulation
— of the Blood — Evaporation —

3
+ Mathematics —
— founded on the axiom that it is impossible for a thing to be that and another thing at the same time —
— From this two quantities equal — add or take away equal — why the reasoning more perfect — axioms — Objects of Mathematics simple — Physics complex —
— use — best system of reasoning
× Foundation or perfection of every art — no situation &c —
× Motion — figure number — Geometry Algebra —
× Indispensable in Nat. Philosophy
— Opinion prevails &c —
— Experiments in Educ; acc Chemist

necessary but not enough —
+ those branches of physics succeed &c

Why Mathes. not generally cultivated
+ Difficult — unentertaining —
+ Easiest of all studies — reason
— Mode of teaching — Demonstration
committed to memory — In Mathes.
the ~~brother~~ Mind & little use —

—
+ Improved mode of teaching —

Old nature continue unchanged
this would constitute all our knowl.
— But we are every moment witness
of an uninterrupted succession of changes
perpetually going on in the Material
world — One event is followed by anoth.
Day succeeds to night &c —
+ Sun rising constantly followed
by day, and his setting by night
— These changes are much more
interesting to us than the circumst.
of resemblance, the object of Natural
History. —
— We are much affected by these
changes — Our bodies are subject to
the alternate changes of heat and cold
light and darkness, spring and frost
of the atmosphere & greatly affect
our health and spirits —

2

7

+ Natural Philosophy
Chemistry

Defined.

1 Natural Philosophy is the Study of the sensible motions and actions of bodies, with a view to discover the general powers of Nature and explain the Phenomena consequent on their exertion —

+ Observe how things are
adjusted to each other in the
works of nature, examine the
connexions, and contemplate
the design, we then view
nature as a work of art
admire the power & skill of the
artist and endeavour to discover
his intentions, this is the object
of Natural Theology —

+ But when the subject of
enquiry is not for what pur-
poses, but by what means the
various changes are effected
what are the causes producing
of Natural Phenomena, we then
view Nature as a subject

of Philosophy and endeavour to investigate its laws —

+ Foundation of Analogy — Universe governed by unchangeable laws — Could we for a moment &c.

1

+ Experiment —
— an appeal to the senses
— Illustration of a particular fact — most convenient mode of proof — Body put in a particular situation — Equilibrium destroyed — In the struggle to restore the Equil: we compel Nature to reveal her secrets —
+ Importance of Experiment —
+ Example — Air pump —
— Hence appears the questionability of laying as a foundation a sufficient number of well attested facts and well performed exper.
— Complete induction —

+ Experiment insufficient —
— only a proof of a single fact —
— But by induction and Mathematical reasoning we can only discover the cause —
+ 12 Lectures &c — March ant 12
Entries —
+ such a course may enable you to read the popular productions of Ferguson or a Nollet — but not to understand the sublime inventions of a D'Alembert or a Newton —

2 Induction — observation —
Example — Mountains in the moon

— The subjects of knowledge are either existences or the relations they bear to each other. —
— Just that I exist and my thoughts or the consciousness of my own existence is accompd. with the highest degree of conviction
— Des Cartes System —
quest &c ✗ — External objects perceived by the 5 Senses —
— Senses are the organs by which a perception of the object and belief of its existence are obtained —
— Sensation the Lang. of Nature informing us of the existence of her works, and perception the interpretation of that language

× The great multiplicity of our wants with the diff. — serve constantly to turn our attention to external objects these instruments of all our pleasures and all our pains —

— A constant coincidence of the sensation &c — begets a belief in the testimony of the senses — Foundation of all our knowledge of nature

— experience requisite —

+ Press the ball of the eye &c

+ Touch an object with both fingers

+

—

Imagined that there existed certain Immaterial forms or Species of Things

• The only objects of the mind's contemplation — only subject of true knowledge —

+ Mind a Mirror by which the forms were presented to the Fancy —

+ Improved by Father Malbranche he asserted that these forms of things existed

+ only in the divine mind, but that the Deity being continually present to every ~~thin~~ being principle, could discover to it such parts of his Ideas as he pleased —

+ Epicurus — certain filmy substances flying from the surfaces of all bodies and from this quest subtilly passed into the mind and was there perceived

+ Aristotle admits, like the others, species or forms, sensible and Intellectual, these are perceived by the active intellect, by means of the impressions which they make on the passive Intellect. —

+ Here the matter rested till Des Cartes. This Philosopher was too bold to be imposed on by any authority, however great. He attacked the Logic of Arist. which had reigned triumphant in the Schools for 18 Centuries — From a more accurate examination of the Phenomena, he was led to this conclusion that the only Obj of the mind's contemplation were Ideas employed there by Nature

with the power of combining them at pleasure —

+ Locke taught nearly the same Doctrine, with this difference only that the Ideas were not employed thus by Nature but acquired by experience —

Doctor Berkley Bishop of Cloyne had too much curiosity to be satisfied with this account of the matter, without tracing it into its immediate consequences.

— He found that those Ideas of Des Cartes and Locke not only could not possibly have any resemblance to the external objects they were supposed to represent, but also that they had no meaning

connection with them, and they might exist without them —
— of this no man can doubt who admits creation, for the Idea of the thing to be created must exist in the Divine mind, prior to the Creation and consequently totally independent of it — Since Ideas then says he are the only objects of Theory the only subject of knowledge we cannot have any Demonstrative proof that there are any external existences corresponding to those Ideas and consequently the belief of the existence of any thing but mind, that is of an external world is a vulgar error.

+ Nowhere extraordinary &c. ——

Mr. Hume —

we are certain of the existence of nothing but that of which we are conscious. we are certain of the existence of our Ideas, but our consciousness, our feeling them is the only proof of their existence they exist only by being perceived — Mind is only an inference from of these ideas. The only certain existence in Nature then are those Ideas which appear and vanish, which are born & die every moment. —
— The existence of mind therefore cannot be proved —
+ wonderfull conclusions ——
— scepticism —
nothing certain — this proposition neither true nor false — this was going some length, but nothing to the conclusions above mentioned

— with one stroke of their Metaphysics arm they annihilate existence
+ Metaphysicians and Philosophers &
+ Have I been so injudicious &c —
+ + Causes of such reasoning
1. Grant these premises &c —
2. Deny —
3. Sterility of language. Keeps peace

Pythagoras 9 500 A.C —
— Motion of the Earth & round the
— Little progress —
+ Aristotle — Christalline orbs
± Ptolemy
+ Copernicus 1543. Died
+ Tycho Brahe 1590 - rejected the Dens
and retained the Ant. — Discovered the
Refraction of the Atmosphere and proved
that Comets are higher than the
Atmosphere —
+ Motion not sufficiently known to
Copernicus — Prophecy. —
+ Galileo and Keplar —
Keplar's Elliptical orbits, 2 areas ∴
3. squares of the Periodical Ts
+ Fond of Analogies — Why the system
is in Plane; Distance &c
what the law of the Motion

Five Planets 10 bodies

Galileo - Telescope - motion

Discovered the Satellites of Jupiter

Phases of Venus - Spots on the

Sun — Descent of bodies by Gravity Parabola —

Astrophil

Des Cartes — Ether — Vortices

Newton

Fri 17

Mr. Harrington

+ + — former

sorry for the accident in the com.

— Diary — left Calcutta on the Mor.

of the 15 — Cawbury — All the other

com.ns Contracts for the present fleet —

Cert by next — balance will nearly pay

for the order — strip fleet will sail about

two months hence — State of Che-

mical Science — Davy's discoveries

Galvanic apparatus in Calcutta. —

— Books sent — Rather 20, 0 — 4 — Which

refuses his com bill — Edwd. review bound

Hyph price of books — Catalogue of no use

— Other reviews — this work and Asiatic Ann. Reg

entire — Rev. Ann. Register not sent. — Two

books added — Playfair and on the Slave

trade — read neither — Pamphlets — Athenæum

5 members — 1 with Mr. Cawthry —

D. M.

Lettrosi business — Rusteds repairs of the telescope — Vol. of the Phil. and Monthly Magazines 3 vols, two sets Phil: Mag: and 3 vols monthly — former to Buton and Foster and the latter to Buton. — Rawlins fire & Nation Carpenters Glue for Mr. Ford — — Exchange — money to interest — — Clock — Gongs — Gods Sola — Thomas McCarthy a number of N. Mus news for June to be sent to — Jn Mr Nunington's care — 6 Vol. D. M 3 Monthly at 10 Rupees each To Buton and Foster — Forsyth's Bill —

J. Bentley —

Dr Maskelyne — papers — Playfair Maskelyne thinks Bentley right — Almanac ordered — ~~[illegible]~~ Maskelyne has no opinion of the antiquity of the Chinese and Hindoo Astn — dep Mathematician —

— Capt. McCarthy —

Tom Math: questions Ladies diary 5th March 1800. — Bill for 100 £ Mr. McC — Tom lived with him. — Difficulty in getting out — Capt. Barton — 100 pounds paid — Bill returned — Sextant — mathematical instruments — Bills rec & one not arrived — Money to Cook before it was due — Mr McCarthy's money —

the filled out Form — Letter not enclosed —
no information to the brother — bought agreement
Money to Cork not sent thro' Charter house —

1st June	Bill for		£ 102,1,7
15 ———	Ditto	———	44,11,0
15 June	Ditto	———	44 15.
			271,8,3
			20 13,3
£		Sum —	291,1,6
Bill for 22		not rec'd —	22,5,10
			~~9 15 0~~
			~~271 17 6~~

— Commission not to be had from the Company — I think you can manage this with your Governor —

J. Hunter — Mr. Playfair rec'd the Arith. Tables from Sir John Murray in the J.'s name — What he thought of them —
— Screw — Shewed it to Professor Robison who did not give any opinion on the subject I do not know what to think of it. —
Puzzled the great mechanics — Shewed Dr. Markley the passage from Bhaskar —
— remembers to have seen similar expressions in modern books — Copy of Bhaskar —
Former expressions absent. —
— Nicholson's history — Mar. a very curious experiment. —
— Transit of mercury more exact —

Kelley —

Mr. Warnabb —

Mr Warrington's continued —
— no commission — —